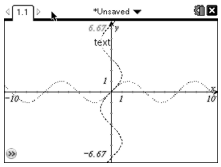
3.8 Derivatives of inverse trig functions

Derivative of the Arcsine

$y = \sin^{-1}(x)$ *means* $x = \sin(y)$



restrict the range to make y=arcsine(x) a function

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$\frac{d}{dx}\left(\sin^{-1} x^2\right) =$

$\frac{d}{dx}\left(\sin^{-1} \frac{\sqrt{x}}{3}\right) =$

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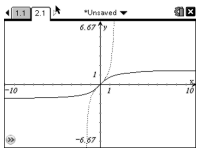
Derivative of the Arctangent



What is the range of y=Arctan(x) ?

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A particle moves along the x-axis so that its positon at any time t>=0 is $x(t) = \tan^{-1}\sqrt{t}$ What is the velocity of the particle when t=16?

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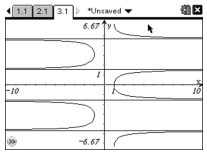
Derivative of the Arcsecant



restrict the range to make y=Arcsec(x) a function

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$$\frac{d}{dx}\sec^{-1}\left(5x^4\right)$$

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Derivatives of the other three

$$\cos^{-1}x=\frac{\pi}{2}-\sin^{-1}x$$

$$\cot^{-1}x=\frac{\pi}{2}-\tan^{-1}x$$

$$\csc^{-1}x=\frac{\pi}{2}-\sec^{-1}x$$

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Derivative of an inverse function

If *f* and *g* are inverse functions then $g'(x)=\frac{1}{f'(g(x))}$

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